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Forum: resilience & design

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ABSTRACT

This forum aims to encourage theorists of resilience to engage more closely with different aspects of design theory and practice. The introduction outlines a series of largely unacknowledged parallels between resilience and design, relating to the valorisation of processes over states, the loss of faith in 'planning', the ambivalent status of boundaries and interfaces, and open-ended political possibilities. Four short reflections then follow on various design-related topics: the significance of the 'wicked problem' in contemporary urban planning and design, and the urbanisation of responsibility; design's potential to repoliticise and engender new forms of responsibility; the significance of the digital interface and the condition of everyday life in the 'unplanned' post-colonial city. Readers are invited to build on or refute the explicit and implicit links made between resilience and design in the various forum contributions.

KEYWORDS

Design thinking; wicked problems; resilience; design interfaces; Kinshasa; Cape Flats Nature

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Resilience and design: an introduction

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'Design' is not a topic which typically features in, or is linked to, critical debates about resilience – perhaps because it lies outside the mainstream of phenomena with which social scientists grapple. And yet even a brief review of the academic literature on these two areas of discourse and practice reveals a series of parallels and similarities which may not have been acknowledged. Indeed, it would be surprising if certain similarities could not be found, given that both 'design thinking' and resilience have been conceptually mobilised in recent years by such a wide variety of powerful social actors, including policy-makers at different levels: we might expect both to be reflective of broader contextual tendencies. But even if such similarities described no more than commonalities of interest among academic commentators, their existence might at least present the possibility of fruitful dialogue.

Since most readers of this journal will be more familiar with debates around resilience than those around design, the main focus here is on the latter. The starting point, in any case, is the recognition that neither term can be reduced to a single body of practices or understandings. Just as there is no single canonical theory of design, or finite set of activities which qualify for the label 'design', resilience has been described as a multiple concept, deployed in varied ways which have 'different geographies and temporalities, diverse effects and different kinds of political implications' (Simon & Randalls, 2016, p. 4), but which – following Mol (2002) – nevertheless 'hang together' (Simon & Randalls, 2016, p. 4). A related problem is that the flexibility of both concepts may work to repel theorisation. Just as design has been described as always 'so situated and contingent on specific situated practices' that it may resist abstraction altogether (Kimbell, 2011, p. 289), resilience has been characterised as having a 'tendency to metabolize all countervailing forces and inoculate itself against critique' (Walker & Cooper, 2011, p. 157).

This introduction nevertheless attempts a broad sketch of some of the ways in which 'design thinking' has spread and been retheorised over time, with selective reference to analogous debates around the variegated landscape of 'resilience thinking'. This need not imply a causal or catalytic relationship in either direction, but does suggest that broader

societal changes may have underpinned design's apparent convergences with the rather newer notion of resilience.

From products to processes

As a distinct activity, design arose within the expansion of consumer markets following the industrial revolution (Secomandi & Snelders, 2012), and was traditionally understood as one dimension of the 'creation of artefacts' (Simon, 1969). The designer, in Latour's (2011, p. 151) reading, had the status of a 'not-so-serious profession', concerned with adding aesthetic appeal to the products of the 'much-more-serious professionals (engineers, scientists, accountants)'. In recent decades, however, the term 'design' itself, along with the promotion of 'design thinking', has gradually entered a wide range of specialised fields. These include, among others: business management (see e.g.: Boland & Collopy, 2004; Brown, 2009; Helfand, 2016); democratic institutions, policy-making and public services (Bason, 2014; Binder, Brandt, Ehn, & Halse, 2015; Dorst, 2011; Kiern, 2011; Kimbell, 2011); NGO activities (Owen, 2001) and international development (Amatullo, 2015; Jackson, 2015); environmental challenges (Myers, 2012); medicine (Dorst, 2011); and even warfare (Kimbell, 2011). We read that

Design is not what it used to be. In schools and in studios, in corporations and in political institutions, designers are using their skills to tackle issues that were previously out of their bounds, from scientific visualization to interfaces, from sociological theories to possible applications of nanotechnology (Antonelli, 2012, p. 6).

And, elsewhere, that design 'has been spreading continuously so that it increasingly matters to the very substance of production', extending from daily objects to 'cities, landscapes, nations, cultures, bodies, genes, and ... to nature itself' (Latour, 2011, p. 151).

This multiplication of the accepted applications of design has been accompanied by a long-term shift in its theorisation. In older understandings, the designer's role was to develop rational solutions to previously unsolved problems (Cross, 2006; Dorst, 2006; Kimbell, 2011). The challenge, or ambition, was to 'scientise' design (Cross, 2006) in the face of rapid technological and cultural changes, and accelerating flows of information, which left designers faced with apparently ever more 'insoluble levels of complexity' (Alexander, 1971, p. 3). The designer was thus idealised in Cartesian terms, as an autonomous subject tasked, by the power of rational thought, with imposing order onto an otherwise poorly understood, or chaotic, external reality (Alexander, 1971).

This ideal would seem to be retained in everyday expressions such as 'by design', emphasising the intentionality rather than fortuity of an outcome. Such usages might be seen as fossilised, however: among practitioners and theorists, the strong sense of the designer's rational agency has been variously diluted over time, as outlined by Kimbell (2011). Rowe (1987), for example, used detailed case studies to debunk the idea that previously unseen but 'ideal' solutions flow in linear fashion from a preliminary rational specification of a problem, emphasising instead the 'messiness' of real-world design as an episodic process drawing opportunistically on shifting logics and flexible principles. By extension, 'the nature of the problem-solving process itself shapes the solution' (Kimbell, 2011, p. 291). This more iterative basis of design is now commonly accepted (see e.g.: Buchanan, 1992; Wendt, 2015). Rather than being amenable to 'scientisation', the processes of design are positively embraced as 'unforeseeable' (Manzini, 2013, p. 65), exploratory (Brown, 2009) and oriented towards an 'open-ended future' (Margolin, 2007, p. 4).

Relatedly, contemporary design thinking blurs the distinction between state and process, between outcome and activity. 'Design' may signify an outcome (as a noun); or an activity or process (as a verb) leading to an outcome. But it has been suggested that 'In contemporary settings ... designs are more appropriately viewed as being simultaneously noun and verb, with every outcome marking the beginning of a new process' (Garud, Jain, & Tuertscher, 2008, p. 352). The rise of new information technologies, allowing 'real-time changes to a design' (Garud, Jain, & Tuertscher, 2008, p. 354) has only heightened this sense that the goals and purposes of design are 'likely to remain a constantly moving target' (Garud, Jain, & Tuertscher, 2008). Here, the first parallels with resilience might be proposed. There may be no verbal form of the noun 'resilience', and yet its conceptual origins in Holling's (1973) work precisely differentiate the 'resilient' system from the 'stable' one: the work of resilience is oriented towards a state of ongoing adaptation. State and process, in other words, become indivisible.

If the flip side of this 'ontological acceptance of flux' is an 'epistemological obsession with learning' (Evans, 2011, p. 223), the adoption of resilience within policy-making is characterised by an embrace of the 'experimental' (Evans, 2011) – just as contemporary design thinking emphasises the value of the "'beta"/prototyping/"tinkering" approach' (Irwin, 2015, p. 236). By extension, as Barnett (this issue) observes, citizens are rendered responsible for 'learning' to live with uncertainty, and reconstituted as 'experimental subjects'.

From planning to coping

Design, cast in this light, is less about 'knowing' things, or coming to know them, and more a type of pragmatic 'coping' (Wendt, 2015, p. 19). As a pragmatic activity, designing involves 'plans of action that borrow their meanings from their practical real-world consequences' (Melles, 2008, p. 89). It describes a process of inquiring, but one in which 'the aim is *not* to develop universal knowledge that represents some external reality, but to bring people together so that they can jointly explore, try out, learn and bring about change in a desired direction' (Steen, 2013, p. 20). Contemporary theorisations of design, then, are framed less by epistemological concerns than the pragmatic dilemma of how to act in an 'undetermined world, where doubt can always be raised' (Mol, 2002, p. 165): asking '*how can we be sure?*' has given way to the question of '*how can we live with doubt?*' (Mol, 2002). For Wendt (2015), design has come to enact a Heideggerian philosophy whereby 'Instead of asking 'How can we know about the world?' we are entreated to consider how the world 'reveal[s] itself to us through our encounters with it' (Dourish, 2004, p. 107; cited in Wendt, 2015, p. 17).

A close alignment here between design and resilience is particularly striking if we reconsider Holling's (1973) foundational article on resilience, and imagine that he is instead advocating design. His concluding paragraph reads as follows:

A management approach based on resilience [design] ... would emphasize the need to keep options open. ... Flowing from this would be not the presumption of sufficient knowledge, but the recognition of our ignorance; not the assumption that future events are expected, but that they will be unexpected. The resilience [design] framework can accommodate this shift of perspective, for it does not require a precise capacity to predict the future, but only a qualitative capacity to devise systems that can absorb and accommodate future events in whatever unexpected form they may take. (Holling, 1973, p. 21)

It is not difficult, then, to interpret resilience as signalling a 'retreat from grand planning' (Haldrup & Rosén, 2013). Equally, the rise of design thinking might usefully be understood as

filling a gap left by an ongoing collapse of faith in modernist planning, within what is widely narrated as a deepening 'crisis of trust' in liberal government and public institutions (Swain & Tait, 2007). Latour observes, relatedly, that 'Design implies a humility that seems absent from the word 'construction' or 'building'' (Latour, 2011, p. 153), such that 'the more we think of ourselves as designers, the less we think of ourselves as modernizers' (Latour, 2011, p. 152). The sensibility of the world's increasing complexity, uncertainty and non-linearity (Chandler, 2014; Rosenau, 2000) renders the possibility of rationally planning the future hubristic (Van Assche & Verschraegen, 2008). And if 'planning' is perhaps most immediately associated with urban space, and the hubris of 'high modernism' most readily associated with failed twentieth-century 'utopian' attempts to reorder the city (Pinder, 2005), it is unsurprising that all four of the discussion pieces in this forum touch on urban questions. While it remains 'difficult, almost impossible, to abandon the notion of steering and to let the future come as it comes' (Luhmann, 1997, p. 41, cited in Van Assche & Verschraegen, 2008, p. 264), the urban planner must proceed in the face of an awareness that the real 'complex, teeming metropolis' (Taylor, 1998, p. 36) will always exceed the horizon of any normative representations.

If the planner's melancholy has been partly offset by the optimism of design, a parallel might be drawn with the way sustainability discourse has been colonised by the norm of resilience (Barr & Devine-Wright, 2012; Cretney & Bond, 2014; Davoudi, 2012). Sustainability or, more tellingly, 'sustainable development' is at least residually modernist in its ambitions: it defines an ideal future state, and urges us to shape this future state through our current actions. But if we are uncomfortable with sustainability's linear normativity being usurped by resilience's iterative pragmatism, should we also be keener to reclaim planning from design? Or if, alternatively, we have an optimistic view of resilience, should we more actively promote the idea of resilience being 'designed' rather than 'planned'?

One reason to rein in our enthusiasm for either resilience or design as resolving the 'problem of planning' is that both rely on the discursive construction of particular types of problematic conditions. As a governance rationality, resilience is predicated on the complexity of the world (Chandler, 2014), or – more pessimistically – on the acceptance of danger and insecurity (Evans & Reid, 2014). Resilience operates through, and urges us to embrace, these problematic conditions, rather than defines itself against them; it calls for 'permanent adaptability in and through crisis' (Walker & Cooper, 2011, p. 154); it sees 'no end point to emergency' (Walker & Cooper, 2011). For its part, design is concerned with 'wicked' problems (Buchanan, 1992; Melles, 2008; Steen, 2013; Wendt, 2015); it responds to the 'idea that established ways of thinking about managing and organizing are not adequate to deal with a fluid business environment ... let alone any number of global challenges from climate change, to resource inequality, to peak oil' (Kimbell, 2011, p. 288). Not only is design thinking, then, promoted as a strategy for living successfully with intractable problems, but it is a worldview in which 'all but the most trivial design problems' are imagined as wicked (Buchanan, 1992, pp. 15–16).

As Barnett (this issue) notes, the 'wicked problem' arose out of debates over planning and design methodologies in the 1960s (Buchanan, 1992). Wickedness was thus constructed to mark the limits of the 'science' of design (and certainly the limits of planning); if the designer was traditionally called upon to begin by clearly defining a problem, the work of specifying the condition of wickedness was itself performative of a linear approach to problem-solving. As, over time, the linear ideal has given way to a more iterative model, wickedness and indeterminacy have been repositioned: rather than marking the limits of design, they have now been internalised into its process. And yet this never finally answers the question of

why design problems are considered to be wicked (Buchanan, 1992). For Buchanan, this relates more to the open-ended scope of design itself – its potentially universal application; and in this sense the ‘wicked problems approach’ is essentially ‘only a description of the social reality of designing’ (Buchanan, 1992, p. 16).

It is compatible with the iterative logic of contemporary design, then, to understand ‘wickedness’ as a type of necessary story which has arisen through the practice of design: it is a problem defined as part of its own resolution. Similarly, resilience’s rejection of linear problem solving potentially enables a reading of various inter-related conditions (complexity, crisis, the risk society, and so on) as narratives mobilised for justificatory reasons. In other words, whether or not the problems faced by the world have in some tangible sense become more intractable, and less amenable to modernist solutions, we should be alert to the possibility that the discursive constitution of these framings may exceed their explanatory force.

From boundaries to interfaces

Various other conceptual boundaries have been eroded within design thinking over time. While older prescriptive theorisation drew a clear distinction, as outlined above, between the rational design ‘expert’ and an untamed context, Lawson’s influential study (first published in 1980, and now in its fifth edition) argued that the essence of design does not relate to ‘technical skills’. While Simon (1969), for example, looked for abstract principles, and Alexander (1971) rejected intuition-led design in favour of systematic logic, Lawson (1980) promoted an understanding of design as imaginative work shaped by real-world constraints. Although he leaves the point undeveloped, Lawson’s highlighting of the *generative* function of constraints implicitly repositions the designer as a co-producer of what results. This is a subtle shift, in which the designer is more explicitly recognised as an embodied and entangled part of the material and social world. It paves the way for, or reflects, a shift in mainstream understandings of design as unlikely to yield beneficial social outcomes when imposed from above. Instead, designers are urged to draw on local participation, ‘collective creativity’ (Sanders & Stappers, 2008; Steen, 2013) and ‘ubiquitous intelligence’ (Freire, Borba, & Drebold, 2011): just as the agency of the designer is thus decentred (Willis, 2006), the user is no longer ‘designed for’, but rather becomes a fundamental part of the process itself.

If the boundaries between designer and context and user are now more porous, the notion of a well-bounded design object seems increasingly problematic. If, as Garud et al. (2008) observe, it has become commonplace to think about objects having ‘hinterlands’ (Law, 2004), we may tend to question Simon’s (1996, p. 6) ontological distinction between an ‘inner’ environment, the substance and organization of the artefact itself, and an ‘outer’ environment, the surrounding in which it operates’. Meanwhile, the influence of actor-network theory (ANT) in particular may make it less acceptable for commentators to draw clear distinctions between materials and human actors, pointing instead to the ‘radical symmetry’ (Rydin & Tate, 2016, p. 6) – though not necessarily the equivalence – of these actants in the processes through which a design is ‘assembled’, and as a way of apprehending the stabilised outcomes of these processes. Accordingly, Yaneva (2009) has argued the case for an ANT approach to analysing design’s role in making the social durable. She suggests that ‘a design project or a disputed design thing resembles more a complex ecology than it does a static object’ (Yaneva, 2009, p. 284), and can usefully be understood as a ‘contested

gathering of many conflicting demands; a disputed assemblage that will divide and congregate and will engage new assemblies of humans and nonhuman' (Yaneva, 2009).

To question the boundary of an object is not, of course, to deny that design leads to tangible outcomes (even if these are temporary or experimental), but it too echoes a shift of practical focus. Designers may still direct attention to the 'form' of the design outcome (Alexander, 1971), but are also increasingly concerned with the *interfaces* 'between people, technologies, and actions' (Secomandi & Snelders, 2012, p. 3). Indeed, in Bonsiepe's formulation, the design interface is the 'central domain on which the designer focuses attention' (Bonsiepe, 1999, p. 29, cited in Secomandi & Snelders, 2012, p. 5): what is designed is primarily, then, not a physical object so much as a set of intended relations. Accordingly, Tkacz (this issue) reflects on the significance a pervasive example of the contemporary design interface – the data-driven *dashboard* – as indicating a particular contemporary epistemological condition, which also has implications for the governance of resilience.

The question of the interface has no immediately obvious correlation with resilience thinking – and yet resilience also performs a reworking of boundaries. In particular, it may tend to construct an 'inside' where people, technologies and actions are interlinked, and an 'outside' from where shocks emerge. A community (or company, or organisation) is resilient precisely because it has negotiated its relations with the outside world successfully. Similarly, design may now be idealised as taking place 'in context' rather than in mastery of its context, but this still rests on an assumption that a particular context is identifiable. A paradox thus emerges, in that both design and resilience require the 'local' to be delineated while, as discussed earlier, simultaneously invoking a sense of the world as open-ended and unpredictable. With regard to resilience, it has been observed that the construction of system boundaries is problematic in the social world, since it 'soon leads to exclusionary practices' (Davoudi, 2012, p. 305). This would appear to reflect the broader tension identified by Simon and Randalls (2016, p. 5) between resilience's delivery through programmatic intervention, and its conceptualisation as a "'self-flowering" characteristic that allows things, systems or persons to flourish when left to their own devices'.

We might wonder whether resilience thinking is more fundamentally about constructing boundaries than has already been theorised. If this problem is to be addressed more convincingly in future, rather than obscured by policy rhetoric, then perhaps the more relational notion of the interface may be a useful conceptual device. Following Tkacz's illustration (this issue), however, there may be an equal need to debunk or pre-empt an assumption that particular interfaces are neutral in their effects on the world.

Moving forwards: from depoliticising to repoliticising

What further questions, then, might design and resilience pose for each other? First, considering the two in tandem may encourage us to be sceptical of policy rhetoric whose implied direction of travel is towards a worldview which only acknowledges 'flux' as the basis of reality; which is finally unable to distinguish between processes and states. Alone, endless unpredictability would seem to be a problematic basis for societal ordering, as evident in De Boeck's narration of everyday life in Kinshasa (this issue). But this rhetorical worldview also belies the fact that, in practice, experimental design initiatives and resilience building programmes are not morally neutral emergent phenomena. Rather, they are set in motion by particular humans, and shape the world in particular ways. Despite the trends towards

valorising 'co-production', and the sensibility of different types of relationality, the designer's position as a key agent has not fully been undermined: the designer's 'expertise' and ability to manage related processes (Freire et al., 2011) remain centrally important. And even when the tools of design, particularly in the digital sphere, have been relatively democratised, successful design at least is thought to rely on particular techniques and skills. Thus, the rhetoric around design's open-endedness sits alongside – and might optimistically be seen as in productive tension with – an explicit recognition that design is driven by contingent political and economic motivations, and leads to varyingly stabilised outcomes. By analogy with this explicit tension within design thinking, it seems important to resist logics whereby resilience is justified by dint of its self-organising emergence: looking beyond the rhetoric involves paying closer attention to the ways in which particular human decisions may lead to particular injustices (Davoudi, 2012, p. 306) – in other words, to 'the question of the political – resilience from what, to what, and who gets to decide?' (Porter & Davoudi, 2012, p. 331).

Research in future might usefully explore the active roles that design thinking plays in reworking political subjectivities. In this respect, resilience has often been viewed by commentators through the negative frames of its 'depoliticising' or 'post-political' tendencies. Various, it has been argued that resilience thinking excludes the possibility of effecting structural changes, due to its concern with adaptation rather than mitigation (Pelling, 2011), the selective imagination of its 'local' scale (see e.g. MacKinnon & Derickson, 2013), by privileging the maintenance of an abstracted 'system' (Welsh, 2014, p. 21) and by repositioning the subject as merely a component in a process of ongoing reaction to changes in a broader network of objects and social relations (Evans & Reid, 2014). We are given to understand that resilience invokes reactionary impulses rather than 'demands any form of affirmative thinking' (Evans & Reid, 2014, p. 6); that it excludes normativity (Bahadur & Tanner, 2014); and that its widespread adoption by national and international governments is indicative of its scope 'to be utilised in a way that justifies and maintains the status quo' (Cretney & Bond, 2014, p. 21). Thinking through the relevance of such arguments to design may yield valuable critical perspectives. More optimistically, the goal may be to go beyond critiques of dominant practices of resilience and design, so as to consider their potential for shaping the world in alternative and more convincingly hopeful ways – as Katzschner (this issue) advocates with reference to a conservation project in Cape Town.

Just as both resilience and design might then be understood as 'repoliticising' (for better or worse), rather than merely 'depoliticising', we may respect the 'neoliberal' framing of many commentaries as providing a counterpoint to the rhetorical excesses surrounding both, while also recognising the limitations of its critical or diagnostic force: 'neoliberalism' has, in some readings, become little more than a catch-all 'political swear word' (Hartwich, 2009). Thus, resilience has been interpreted as a product or catalyst of neoliberal economics (Joseph, 2013; MacKinnon & Derickson, 2013; Walker & Cooper, 2011). For Walker and Cooper, 'the success of this ecological concept in colonizing multiple arenas of governance is due to its intuitive ideological fit with a neoliberal [Hayekian] philosophy of complex adaptive systems' (Walker & Cooper, 2011, p. 144). In a more immediate sense, meanwhile, the rise of design in recent decades has been described (Julier, 2013, p. 220) as 'one of the fruits of neoliberalism', related to the deregulation of markets (with associated ongoing needs for new packaging and products), the privatisation of welfare provision, the reliance of 'individual and corporate entrepreneurialism' on 'design and innovation – and therefore a 'creative class' – to ensure their differentiation in the marketplace', and the importance of cultural goods in the

post-Fordist system. In parallel, however, resilience thinking has also been adopted by anti-capitalist grass-roots activists (Cretney & Bond, 2014), while design has been promoted as a potential mode of challenging or resisting the neoliberal order (see e.g.: Berglund, 2013; Hackney, 2013; Julier, 2013; Irwin, 2015), and as well aligned with subaltern struggles for autonomy in the global south (Escobar, 2017). Design's potential to solve contemporary social and environmental problems, we are told, exceeds and should not be confused with the structurally constrained practices of the neoliberal-capitalist 'design industry' (Boehnert, 2014). From a third perspective, resilience has been interpreted as a (problematic) 'postliberal' project taken up and promoted as a way of obviating the limitations of neoliberal policy-making (Chandler, 2014).

Our thinking may be liberated if we reject the need to adopt a single perspective on either of these 'multiple concepts', and look for more positive lessons by considering both as related sets of practices potentially interpellating variegated new modalities of politics, rather than as inevitably suppressing the political or problematically operating outside the political sphere.

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Planning as design in the Wicked City

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The urbanisation of responsibility

In the first two decades of the twentieth century, a consensus emerged across policy fields about the importance, perhaps even the centrality, of urban processes to addressing challenges associated with everything from climate change to economic growth, poverty eradication to public health and food security to harnessing the digital economy. The breakout of 'metrophilia' (Morgan, 2014) is most often framed in terms of a demographic transformation, in which much is made of the larger numbers and higher proportion of the world's population living in urban settlements. The precise dimensions of this putative urban transformation are subject to much debate (McGranahan & Satterthwaite, 2014). In the proliferation of initiatives that have been stimulated by the rhetoric of a majority-urban future – around such topics as 'smart cities', 'metropolitan revolutions' and 'urban futures' – it is possible to discern the rapid consolidation of a novel style of urban optimism. What is distinctively new about the so-called 'new conventional wisdom' about cities is that it emphasises urban processes not just as sources of problems, but also as sites of opportunity and potential (see Gordon & Buck, 2005).

The growth in the size and complexity of cities, the increase in urban populations and the generalisation of urban living have all become matters of public concern through a recurrent discourse of responsibility (Barnett, 2012). More precisely, there is a widely shared theme that urban processes bear a double responsibility: as causes of myriad contemporary challenges; and as providing opportunities to address those challenges.

In the first sense of urban responsibility, cities and urban processes are identified as causally responsible for generating risks, crisis and threats. One can find this sort of understanding in everything from arguments about the urban roots of the global financial crisis of 2008 (e.g. Harvey, 2010) to arguments about the relationship between urban living and various health crises such as obesity (e.g. Colls & Evans, 2014). In the twenty-first century, urban processes are now ascribed significance as central to an overlapping set of global challenges generated by ecosystem degradation, climate change, peak oil, systematic inequality and persistent poverty, food insecurity and energy transitions (see Swilling & Annecke, 2012).

It is the heightened responsibility of cities in this first sense that links to the second sense of urban responsibility, wherein urban-scale institutions, infrastructures and communities of interest are identified as being empowered to respond creatively to these multiple challenges. One sees this more positive sense of urban responsibility in, for example, the development of experimental urbanisms such as transition town movements; in the emergence of city-based climate change initiatives seeking to develop strategies of adaptation or resilience; in the evolution of design-based solutions to health issues; and in arguments for the potential of technologically enhanced 'smart city' solutions to enable more efficient monitoring and management of complex urban interactions. This second, refined view of the responsibility of urban practices finds its most assertive form in the inclusion of a so-called

'Urban SDG' in the United Nations' Sustainable Development Goals agenda, approved in 2015 (see Parnell, 2016). In this view, the urban is no longer considered merely as the scene for a residual field of spatial planning, managing externalities generated by more general processes. A conceptual shift is underway towards thinking of global processes as necessarily working *through* places, localities and regions rather than simply impacting them from 'above' (see Barnett & Parnell, 2016). It is now widely assumed that there is a series of positive feedback between urban development and economic *competitiveness*, social *cohesion*, and responsive *governance*, and, increasingly, environmental *sustainability* as well.

One can find, then, across often very different fields of policy and practice, a shared genre of analysis in which specific problems are ascribed to urban causes, and at the same time urban practices are configured to enact specific types of resolution to those problems. The reason for emphasising the ways in which ascriptions of responsibility are key to the way in which cities and urban issues are publicly debated is to underscore the degree to which such discussions are concerned with opening up particular forms of action (see Barnett & Bridge, 2017). The conventional wisdom about our urban age is not based upon an agreed upon conceptualisation of 'the city' or 'the urban'. It is, rather, based on a pragmatic concern with specifying and mobilizing the different things that cities can do.

Learning to live in the Wicked City

The recurrent framing of the city or urban processes in terms of challenges *and* opportunities is central to the way in which 'the city' is now investigated and theorised by a range of interdisciplinary and often non-academic fields. The proliferation of urban concern in contemporary policy and public debates marks a significant shift in the intellectual focus for academic research on urban processes. 'The city' is now investigated and theorised by a range of interdisciplinary and often non-academic fields that exceed the conventional homes of urban research such as human geography or urban and regional planning. Demography, design, engineering, environmental studies, information sciences, health sciences, the arts and humanities, and security studies are amongst those fields now in the forefront of re-defining what counts as 'the city'. Cities are discussed in discrete literatures on topics such as cities and climate change, smart cities, the right to the city, cities and innovation; in specialised practice-oriented fields concerned with developing design-based, behavioural or engineering solutions to varied urban challenges; and in specialised fields of scientific research on topics such as urban water management or urban life and mental health.

Amidst the proliferation of urban concern evident across different fields, the meaning of 'cities' and 'the urban' has become highly variable. When people talk about the city or urban life, these days, sometimes they are referring to a combination of a very broad range of concerns or issues. Sometimes, they are referring to an idea of the city as a *site* of sociability and of living together, or as a situated field of innovation and potential economic growth. These ideas draw on a view of the urban in terms of the clustering together of proximate activities, whether in terms of arguments about the agglomeration efficiencies that characterise urban economies, the scaling processes associated with city-size or the sociocultural benefits that follow from the concentration of diverse populations in urban areas. Alongside this idea of the city as a site of proximity, there is an understanding of the city as a *hub* in wider networks, including urban–rural relations of migration or trade, as well as environmental relationships that extend beyond the scale of any single settlement.

And these two images – of the urban as a site and as hub – are distinct from but often related to a stronger claim concerning the role of the city as a *scale* for the integration of various processes into a holistic, systematic approach to management, planning and regulation. It is this third claim that is, for example, especially important in the assertion of a New Urban Agenda in global development policy (see Caprotti et al., 2017). In this third version of the urban, the city emerges as a figure for the very possibility of responsive and accountable concerted action.

The consolidation of urban optimism in contemporary policy and public debate is also associated with a distinctive reorientation of fields of urban expertise. One way of capturing this shift is by tracking the changing ways in which urban processes have been theorised as ‘wicked problems’. The original concept of wicked problems emphasised the inherently partial and uncertain qualities of policy interventions, as well as the inherently contested quality of the means and ends of such interventions. It is an idea sourced from both design theory and planning theory, originally developed in relation to challenges of rational decision-making arising from complexity, pluralism and conflict (see Rittel & Webber, 1973). The idea of wicked problems was initially developed in the late 1960s and early 1970s in relation to the specific features of urban issues such as inner city poverty, housing provision or spatial concentrations of crime. Crucially, in its original formulation, the idea of wicked problems was developed as a *critique* of the overly optimistic promises by technocratic social analysis to solve complex issues through the application of data-systems (see Goodspeed, 2015). The legacy of this critique has been to reorient urban analysis away from a technical imagination of rational planning towards a design-imagination, in which questions of the relationships between plans, design and decision-making come to the fore (see Batty, 2013, pp. 301–303).

The idea of wicked problems has been revived in the twenty-first century as a way of identifying problems that can be solved by being subjected to new forms of complexity science and resilience thinking, such as climate change and public health and terrorism (see Zellner & Campbell, 2015). What is notable about these recent invocations is that the affirmation of professional modesty originally associated with the idea is often missing. It is now common to find new forms of data-led science championed as having the potential to address what are initially presented as wicked problems by breaking down and modelling their complexity in order to deliver clear solutions to decision-makers (see Townsend, 2015). Moreover, whereas urban issues were once the *exemplars* of wicked problems, the reassertion of this concept as a relevant way of framing all sorts of twenty-first century challenges as open to expert analysis is now associated with the claim that cities and other urban settlements are the privileged spaces for addressing any number of wicked problems.

In short, the 40-year career of the idea of wicked problems helps us see that cities are no longer thought of as merely local places impacted by global processes or as the locations of distinctively ‘urban problems’. Rather, they are now presented as the key sites for the development, trialling and translation of all sorts of initiatives intended to address all sorts of problems that extend far beyond the traditional scope of ‘urban policy’ or ‘urban and regional planning’. In this reframing of myriad wicked problems as best addressed through urban-scale interventions, one sees how all sorts of fields of practice have come to think of themselves, implicitly at least, as concerned with the central problems of planning, if by that we think of ‘planners’ as ‘all those who need to learn about their environments – public or private, social or natural – in order to change them’ (Forester, 2006, p. 124). In a sense, ‘the

city' now appears as the variable form that can serve as the vector in which claims of expertise can be squared with acknowledgements of uncertainty.

The experimental subjects of *Metrophilia*

The ambivalence about expertise – about just how knowledge can and should be linked to action – that is so central to the original idea of wicked problems is still evident in the degree to which the rise of *metrophilia* in public debate goes hand in hand with the observable trend to think of specific places as *experimental* sites for policy, technological and social interventions (see Caprotti & Cowley, 2016). There are in fact a wide range of notions of the experimental at work in contemporary urban thought (see Karvonen & van Heur, 2014): these include ideas of using towns and cities as 'test-beds' or 'laboratories' for bounded experiments; as locations for 'piloting' targeted policy interventions; as sources of 'best practice' case studies; as sites of 'comparative learning' between places; and as 'catapults' for generating innovation. More abstractly, the experimental is sometimes invoked to bring to mind images of creativity, edginess and innovation – of doing things differently. Sometimes, by contrast, it is a theme invoked to assert more positivist ideas of identifying 'what works' or establishing 'proof of concept'. In both of these senses, there is at work a series of layered assumptions about how things learnt in one place might be applied or translated to others, for various purposes.

The generalisation of an experimental disposition amongst expanding fields of urban expertise requires a recalibration of critical analysis. There are three lines of further inquiry that arise from the ways in which urban processes are now problematised in policy-making, in academic research, in investment decision-making and in arts and culture strategies. First, one can ask about the causal rationalities that underwrite different efforts to configure existing and new spaces or urban life. Spatial disciplines such as architecture and planning have long-standing attachments to particular assumptions about the causal power of the spatial forms, built environments and designed settings in which human action takes place (see Huxley, 2006). But similar assumptions are also found in other fields too, for example, in traditions of public art practice and in practices of deliberative policy formation. These causal rationalities are the flip side of a second set of questions about how people are assumed to *learn* new ways of working, or to live with risks or new ways of living together. And linking these two sets of questions – about the forms of knowledge that professionals and practitioners bring to their engagements with the lived spaces of everyday life, and about the forms of learning through which people negotiate those spaces – there is a third question about what sorts of capabilities are ascribed to what one might call the experimental subjects of twenty-first century urbanism. The idea of experimenting on people should, one might suppose, raise far more questions than it currently seems to do about the ethics and politics of contemporary urban interventions, whether these are reliant on data-heavy models of the smart city or intimate practices of community art.

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Design, responsibility and 'staying with the trouble': rethinking urban conservation in Cape Town

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The question is not what you look at – but how you look and whether you see.

-Thoreau

Introduction

From Barnett's perspective (this issue), the urbanisation of responsibility reflects a broad shift towards a problematic assumption that society can learn to live *through* uncertainty, risk and 'wicked problems'. Thus, in place of an understanding that these contemporary conditions mark the limits of our problem-solving abilities, an optimism has emerged about their generative possibilities. Rather than scoping out a critical agenda for thinking about this shift, the present paper is oriented towards acknowledging some grounds for the optimism through which it is communicated. In line with Barnett's observations, I understand the rise of design thinking to indicate a reworking of the idea of responsibility, but I interpret this reworking in a more generous light. In particular, I suggest that design processes accommodate a responsible sensibility of dynamic complexity which potentially repoliticises their participants, and usefully decouples sustainability from its modernist roots.

I begin from the proposition that such decoupling is necessary, insofar as 'humanity now reaps the deadly harvest of that which the exploitation-based paradigm of western civilization has sown' (Evans, 2016, p. 3). In order to survive the 'ruins' (Haraway, 2015; Tsing, 2015) of modernity, other social ecological forms, other logics and relations, may have to be nurtured to replace it. I wish to entertain the possibility that design-thinking promises a new culture and practice for a deeper sense of connection, obligation and responsibility. Like resilience, design appears to reflect a contemporary *zeitgeist* which demands a contextual way of seeing, is oriented towards ongoing learning, draws strength from the open-endedness of the future and assumes that we can only ever step into the unknown. If we are all increasingly called upon to be designers (Manzini, 2015), responsibility can no longer be the domain of 'experts' who impose 'solutions'; rather, in a time of urgent interruptions and narrow possibilities, design may allow us to 'listen' (Vazquez, 2017): to pause, hesitate and search for generative alternatives.

The localised, reflexive dimensions of this new sense of responsibility are here explored through an outline case study, of Cape Flats Nature (CFN) in Cape Town. This project, running between 2002 and 2010, aimed to build good practice in sustainable management of nature sites in the City of Cape Town's Biodiversity Network. This, it was hoped, would simultaneously develop local leadership for conservation action, and benefit surrounding communities, particularly townships characterised by low incomes and poor living conditions. I take this project as just one example of an approach to sustainability underpinned by design-thinking: it aimed not to develop universal knowledge but to bring people together, to create responsive processes resulting in unpredicted transformative outcomes. Local knowledge was not

seen as a resource to be drawn on in a process of goal-oriented planning: rather, the processes themselves formed part of the outcomes.

In response to Latour's (2016) call to 'reset modernity', CFN rejected dominant scientific approaches to natural resource management and nature conservation: rather than being premised on a distinction between 'science-based' content work and unscientifically grounded social process, it began with an understanding of nature as steeped in colonial patterns of power and knowledge. My aim is not to suggest that technical or scientific knowledge have no value, but rather that CFN illustrates the ways that a design approach to problem-solving tends towards the destabilisation of dominant knowledge claims, and the valorisation of other forms of context specific knowledge. This approach is far removed from the mainstream commercial applications of design thinking, whose emergent circuits of knowledge are systematically distorted by capital (Boehnert, 2014). It replaces modernity's binary understandings and techno-scientific utopias foreclosing the future (Vazquez, 2017) with an orientation towards empathy (Koppen & Meinel, 2012), relationality (Vazquez, 2017) and radically open futures.

And if I appear to romanticise the success of the CFN project, I do so deliberately: my aim here is not to subject the case study to critical analysis, nor to evaluate it against preconceived norms. Rather, I propose that CFN fundamentally resists criticality when interpreted as a 'convergence space' (Escobar, 2008), enabling a particular relational knowledge to emerge which has in turn re-configured emergent practices of conservation, and generated unpredicted forms of solidarity around wellbeing and ecology.

Cape Flats Nature: close encounters & countercurrents

South Africa's violent and divisive colonial and apartheid histories have made it a haunted context, its 'natures' knotted up with phantoms, histories, remnants, submerged stories and ways of knowing. Violence here has disrupted meaning systems, ways of life and everyday existence. Models of nature conservation in the past were superimposed on the South African reality where many different cosmologies and modalities for understanding human-nature relations exist alongside each other.

The Apartheid government was notorious for its programme of forced removals. In Cape Town, people classified as 'non-white' were moved from their homes in and around the city and its suburbs beneath Table Mountain to the Cape Lowlands. Popularly known as the Cape Flats, this area was some distance from the city, its infrastructure, services and job opportunities. Like the residents, the biodiversity of the area was neglected. Only small pockets of the unique Cape Flats plant life and the animal life, it supports survived the rapid development of human habitation. CFN was based on the idea that as the different elements in an ecosystem are interdependent, so are effective nature conservation and the wellbeing of communities. It worked towards an urban nature and urban ecology released from the sole domain of the natural scientist, and thus marked a conscious departure from the traditional nature conservation worldview in which humans and nature are conceptually separated (Layne, 2013; Pitt & Boulle, 2010), and which in the South African context has been closely implicated in processes of social control (Singh & van Houtum, 2002). The project aimed to build effective social nature conservation practice, by asking how we should care for biodiversity in a context of urban poverty and inequity, a location of unresolved colonial trauma, and ecological, social and institutional fragmentation.

CFN (a South African National Biodiversity Institute partnership project founded by the City of Cape Town, the Table Mountain Fund of WWF, the Botanical Society of South Africa, and supported by CapeNature and the Table Mountain National Park) explored new ways to practise nature conservation in response to a growing understanding that without the full participation and engagement of all communities, nature conservation is a battle lost before it has begun. The project explored new ways of protecting highly threatened urban nature by developing fences of local care rather than of razor wire (Hill, 2006; Pitt & Boule, 2010). In attempting to weave different relationships with peoples and natures, the work of CFN was pioneering, contested and vulnerable as it fell in the cracks of institutional boundaries. The intention that birthed the CFN project was not to 'conserve biodiversity', which had become the rallying cry for environmental work across the city, but rather to help make nature accessible to, and meaningful for, all citizens of Cape Town (Katzschner, 2013).

The 'solution' thus devised was not a replicable recipe or set of guidelines with an accompanying checklist to support roll-out. Others may wish to evaluate its transferability, or critique its content from different theoretical perspectives – but here I cast this solution as a practice of seeing and engaging with the biophysical and social systems of ecological and social communities in and around these sites as an integrated whole. The goal of conservation was embedded within a holistic understanding of an ecosystem's functionality as cultivating relations that yield life (Layne, 2013). In what Layne (2013) has described as an 'ordinary magic', conservation was transformed from a 'thing' being done into a 'way of being together'. It performed a space of conversation, bringing people together to jointly explore, experiment, learn and bring about change in a desired direction.

Swyngedouw suggests that the conceptualisation and narrative of the Anthropocene presents us with the challenge of 'demanding the impossible and realizing the improbable' (Swyngedouw, 2011, p. 82). It urges us, in other words, to question policy interventions which close down democratic political space, and to think in open-ended ways about more egalitarian socio-ecological relations. The CFN project faced an 'impossible' challenge: it was charged with building relationships between people and nature in the most unlikely, 'improbable' conditions of the lowest income communities in the city. Given the ecological and social context of the work – fragmented nature sites, fragmented communities – this intention was nothing less than radical (Layne, 2013). The 'mainstreaming' to which the project's title referred ('Mainstreaming Biodiversity on the Cape Flats') pointed away from dominant institutional norms of sustainability, towards building the meaning and relevance of biodiversity in the everyday lives of ordinary people living around nature reserves, contributing to what was important to local people and doing it in a way that strengthened local community structures and processes (Layne, 2013).

I suggest that the radicality of its (successful) outcomes was enabled by the *design* process through which it emerged: in blurring the nature-culture divide, it allowed both for an opening up of democracy and for a more convincingly tenable mode of conserving local biodiversity. This was made possible precisely through a design process understood as unforeseeable, exploratory and orientated towards an open-ended future (Cowley, this issue). And the 'impossibility' of CFN's task was also part of its gift: by being invited to plunge into the relatively unknown, the project had permission to make mistakes and was born with an orientation to learning. Rather than being risk-averse, it welcomed experimentation and ongoing constructive critique; its embrace of the unknown stimulated and animated its

practice. Its design philosophy was productively humble in its understanding of both the project and the world itself as undetermined.

The approach wasn't about imposing knowledge, but about generating knowledge, fueling collaboration and collective impact: while seeking to change the world, the project was open to being changed by the world. Its search for new ideas, for 'other' practices, would not have been possible from a defended place of strength; instead, it created a safe space for being unsafe and asking new questions. It succeeded in 'adding reality to matter of fact' (Latour, 2004) by weaving the social and political dimensions of conservation into their ecological ones. The work with local communities was more than a process of information gathering: it was about thinking, asking and listening, turning the unthinkable into the possible.

Conservation and protection of the local environment, consequently, has not been the only tangible outcome of the process. Just as significantly, it has given a voice to new, young black conservators – community champions whose voice shifted the possibilities for the excluded and powerless to be part of the process of biodiversity conservation. And these new forms of activism have in turn changed the flora themselves (Katzschner, 2013). The future of the local Macassar Dunes site, for example, was shaped through a process of open-ended dialogue. This carried with it an apparent risk that the local community, thus empowered, would express the desire to encroach further on the site (Katzschner, 2013). Instead, however, the trust and sense of connection thus engendered gave rise to a reversal of an antagonistic situation, whereby 'nature' was threatened by the instrumental greed of 'man'. Instead, new local discourses were shaped which underpinned the survival of the dunes. By engaging multiple sensibilities – head and heart, perception, intuition, feeling and imagination – it also shifted and changed all that it touched (Katzschner, 2013).

Conclusion

Faith is taking the first step before you see the whole staircase.

-Martin Luther King

The times are urgent, we must slow down

-African Proverb

From a critical perspective, both resilience and design may imply the abnegation of the modern state's responsibility. In eschewing traditional strong normative governance, both place their faith in emergence. The notion of 'community' may often have been tagged onto resilience policy discourse in an attempt to 'answer the charge that it presents itself as normatively neutral' (Mulligan & Rogers, 2017), but this rhetorical move remains at odds with processes of the individualisation of responsibility and risk (Joseph, 2013; Vilcan, 2017; Zebrowski, 2009). Here, I have focused on the potential for design-thinking to engender a more convincing sense of collective, context-specific responsibility which neither preaches certainty, nor retreats into fatalism. Rather, it accepts Donna Haraway's invitation that we should 'stay with the trouble' (Haraway, 2010). Design thinking in this case helped encourage an approach to sustainability that values learning about problems and stimulates collaboration and questioning. It has the potential, in line with Haraway's plea, to encourage ethical thinking alert to the webs of power and complicity in which everyone is entangled. This is a mode of design in the service both of democracy and of more egalitarian socio-ecological

relations. It reveals dynamic connections and complex interdependencies; it stands in the way of facile solutioneering.

Design, viewed in an optimistic light, provides a counterweight to our urgent cravings for certainty in a world of wicked problems and inter-related catastrophes. The work of repair enabled by the CFN approach did not rely on commitments to fixed and predetermined measurables and outcomes; rather, the sustainability of its legacy describes the extent to which it was able to grow people, places and their emerging relationships (Pitt & Boule, 2010). Rather than entrenching the status quo, as some critics of resilience and design would have it (Cowley, this issue), the CFN project demonstrates the constructive potential for design to activate new voices of dissent from received wisdom, rendering possible that which is beyond our otherwise limited knowledges of cause and effect.

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In a world of data signals, resilience is subsumed into a design paradigm

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A government department. A hospital. An early warning and disaster response centre. A university. An individual going about daily routines. A city council. A think tank. Over the past three years, I have witnessed the use of information dashboards across these different scenarios. Once the stuff of expert systems, information dashboards have become a regular instalment of organisational and, increasingly, personal life. I have been studying these dashboards as a way to think about data in use and especially as this relates to decision-making. Dashboards bring together and visualise different measures of data, typically on a single screen. There are many ways that this can be done, with a mixture of charts, maps, gauges and more bespoke techniques; and they can be used for different purposes, from quick ‘overviewing’, to regular monitoring or data analysis and exploration (Few, 2013). While dashboards and dashboard-like displays have been used in some contexts for over 50 years, recently this use has greatly expanded.

To study these displays is to take a specific methodological gambit in relation to ongoing discussions of big data or ‘datafication’ (Kitchin, 2014; Mayer-Schönberger & Cukier, 2013). It is to focus on data in use, at the point of decision-making, where it can be acted upon. This methodological decision backgrounds as much as it reveals, but what it reveals is, I think, worth dwelling upon. The study of dashboards makes visible an emerging epistemological condition, even a paradigm, what I call the *data signal*. But before detailing what this data signal is, and what it has to do with a discussion of design and resilience, I need to make a detour into the field of economics and an older type of signal, price.

While economists study any number of things, a large portion of economics as a discipline concerns the study of markets. Most markets are comprised of things that are bought and sold. This process of buying and selling is usually reliant on price, which communicates a notion of value and helps mediate exchange. How price contributes to the organisation of

buying and selling in a market, as well as how it relates to value, is by no means straightforward (Çalışkan, 2010). Within one strand of liberal economic thought, though (what critics describe as 'neoliberal'), price serves a very important political and organisational function within a market. It isn't simply that price communicates value, but rather price facilitates widespread organisation or 'coordination' in a system that does not rely on a central point of decision-making. In a popular essay, the Austrian economist Friedrich von Hayek put it like this: '[I]n a system where knowledge of the relevant facts is dispersed among many people, prices can act to coordinate the separate actions of different people ...' (1945, p. 526). Price communicates signals about changing conditions within a market and these 'signals' inform the decisions of buyers and sellers. As market actors encounter prices and make economic decisions in relation to them, these decisions are thought to be reflected in the (future) price and its fluctuations. It is through this relation to price that the distributed preferences of individuals could be registered. For Hayek and other defenders of market economies, this function of price is essential. Price coordinates, but it does so by taking everyone's decentralised decisions about buying and selling into account:

The peculiar character of the problem of a rational economic order is determined precisely by the fact the knowledge of the circumstances of which we must make use never exists in concentrated or integrated form but solely as dispersed bits of incomplete and frequently contradictory knowledge which all separate individuals possess. (Hayek, 1945, p. 519)

The neoliberal critique of centralised planning is based in the perceived incapacity of centralised planners to access the situated knowledges of individuals – an incapacity that a properly functioning price mechanism is thought to overcome. The political claim that markets are a superior form of social organisation is dependent on this function of price (as signal and organising mechanism).

As a signal, price has a specific set of qualities. Insofar as they materially transmit quantities of information, price signals operate on the lower thresholds of the semiotic spectrum. They form part of the materiality of what Umberto Eco called the 'sign-function' (1976), but offer little themselves in terms of signification. Price signals go up and down or remain steady, and these states can vary in duration. Price signals thus communicate through their relation to change over time, and the situation in which they appear. The amount of information contained in them is fairly limited (up, down, steady, duration), such that on their own they rarely have explanatory power. Price signals do not impose a course of action on their interpreters – they are not commands, orders or rules – and instead require decisions to be made. The open-ended nature of the price signal, the fact that it does not compel action, is the basis of its attraction to liberal economists. It is, in fact, central to the production of (economic) freedom or what Michel Foucault more sceptically described as 'liberogenic' devices (2010, p. 69). Price *signals* are found wherever there are prices (and markets) and thus, price signals are thoroughly distributed entities. This means they operate on the scale of individuals, or rather individual exchanges, and the scale of the whole market simultaneously. The signalling function of prices mediates this relation between the individual and the market. The ideal of the market, mediated through price signals, is a population of individuals making situated decisions which results in the allocation of resources with no central command.

As noted, neither prices nor markets typically function in the way proposed by neoliberal or neoclassical economics (Çalışkan, 2010; Schumpeter, 2010). The persistent appeal of markets, and their price signals, however, is the capacity of price signals to operate on this micro level, to take account of what Hayek called 'the man on the spot' (1945, p. 524) and to

communicate or coordinate that 'on the spot' activity with other times, places and resources. The activities of each 'man on the spot' influence the movement of price, which creates signals for other market actors, and so on. The idea of a planned economy is replaced with the coordinating mechanism of prices and distributed decisions based on fluctuating signals. While the price signal is presented as an economic phenomenon, it forms a core component of a general theory of governance. Any number of criticisms have been launched at the neoliberal economic project, but very few have done so on the basis of the calculation of signals (Brown, 2015; Dardot & Laval, 2014; Davies, 2016; Foucault, 2010; Mirowski, 2014, 2015). Reenter the data signal.

Those who attend to dashboards are observing data signals, or rather, they are observing data for signals. The materiality of these signals, how they are generated, transmitted, stored and processed, differs significantly from how Hayek wrote about price. Data signals *are* distributed and they do travel and move between scales, but they rely on large-scale infrastructure to do so, or what Jennifer Gabrys has described as 'planetary computerization' and the 'becoming environmental of computation' (2016, p. 267). These signals vary; they are diverse and multiple. While some dashboard formats may be shared across an organisation, and many dashboards will present data that can be found on other dashboards, dashboards are designed to bring together the signals required for a particular context or situation and thus what is displayed often differs from one person to the next. Data signals signal different things to different users with different dashboard configurations. There is no 'market' to which a data signal refers, but rather a world encoded or 'entextualised' (Castelle, 2013) as data points – call it world-as-data-warehouse – from which any number of signals can be extracted.

Data signals share price signals' capacity to register or 'sense' individual distributed activities. These could relate to economic exchanges – which generate transactional data – but any number of other activities can be encoded. A body at rest, a surgical procedure, movements of a river, available car parking spaces in a city, applying for a driving licence, the 'sentiment' of social media comments – the empirical sources of data signals are degrees above that of prices.¹ Indeed, the entirety of price signals is now a mere subset of data signals. While data signals are distributed and travel, as material signals, across any number of information systems and communication infrastructures, they are formatted into dynamic centres. A dashboard is a centralisation of data signals. But because data signals can be centralised through any number of dashboards (and related intelligence systems), and because they are generated from 'the spot' (if not necessarily the Hayekian 'man') or more appropriately 'where the action is' (Dourish, 2004), they reconfigure the relationship between centralised 'planning' and supposedly unplanned market dynamics. The promise of data signals is that they give a planner (or decision-maker) access to the movements of 'the spot', to 'where the action is', while simultaneously distributing this access through their representation in dashboard formats (a distribution which is not uniform or standardised and thus may be an important site of political contestation in the future).

While the data signals displayed on dashboards operate on different temporal rhythms, all are geared towards the present, or rather the possibility that a decision will be made 'now'. Translated into representations on the dashboard, some signals make a claim upon real-time temporalities (even if this temporality is always a 'construction' and subject to the mediation and speeds of computation), while 'presentness' is also achieved through the juxtaposition of different data representations (a graph, table, gauge, map, and so on) such that a user must attend to and interpret their relations. As signals, and similar to price signals, these

forms of data remain on the lower threshold of signification; this is the basis for their 'addressing' a user *as decision-maker*. In other words, a dashboard will not tell a user what to do. Their function is to gather and present distributed signals.

Hayek was explicit about approaching markets as information processors which parse innumerable micro-exchanges and reflect this processing work through price (1945). Data signals, which rely on the widespread distribution of computational actors, always need an interface for turning signal into sign, that is, for making decisions (Nake, 1994). Despite great variance in their materiality, data signals are always geared towards a cognitive milieu. As a pioneer of human-machine interface design put it, computer interfaces are for 'augmenting human intellect' (Engelbart, 1962). Through data signals, this augmentation now acts on a planetary scale, sensing tiny variances in state or the smallest of actions, and with a view to instantaneity. Data signals establish *massively augmented cognitive presents*. This has serious ramifications for approaches to economics, but goes far beyond economic considerations.

It has been noted that the discourse and practice of resilience has parallels with that of neoliberalism (see the introduction to this issue, and also Chandler, 2014; Walker & Cooper, 2011). What is shared is a certain *laissez-faire* disposition, whereby both the market and the forces of nature must be left to take their course. This eschewal of planning, of the strategic intervention, marks both as anti- or postmodern. Both positions must not be mistaken for taking no action or letting things be, more generally. It is now common wisdom that governments have spent the last 40-odd years proactively creating the conditions of markets (and competition) across all areas of life (Brown, 2015; Dardot & Laval, 2014). This cultivation equally requires constant regulatory attention if markets are to function in ways resembling their economic ideal. For its part, resilience equally makes possible any number of interventions – new architectures and infrastructures, new government policies and commercial opportunities, new disaster procedures, new approaches to community and so on.

With the rise of the data signal, economic, urban and ecological ways of knowing and acting are converging. The representation of patterns of employment or of weather begin to resemble one another. Indeed, they can be brought directly into relation if desired. They converge in the same epistemological frame (of dashboards) and respond to the same signal-ontology. This epistemological frame, made possible by the planetary scale signal-ontology, is no longer one of letting things take their course – the question of planning is once again on the agenda.

But, and by way of conclusion, the emergence of the data signal does not imply a revival of modernist planning. Instead, modernist planning is replaced with a design paradigm. Design comes to the fore as a set of concrete practices but also as the governing epistemology of any situation where the data signal is in operation. Without speculating on the future of neoliberal governmentality, the design-data signal nexus is post-neoliberal in theory and practice. Having long internalised the critique of planning, designers prefer iterative approaches and often work through heuristics. Overarching design principles are matched at the level of practice with things like design patterns – repeatable implementations to commonly occurring problems. In the realm of the digital, design is primarily concerned with the creation of 'experiences' for populations of users (Benz, 2014; Garrett, 2010). These experiential users are 'where the action is' and also what design explicitly acts upon.

While data signals are generated through large-scale infrastructure and thus are reliant on engineering, the efficacy of the signal is not primarily an engineering question. Whenever human activity is the basis for the generation of data signals, we are in a design paradigm

(and experience or interaction design, specifically). Equally, the points at which data signals are translated into signs and thus made meaningful and 'actionable', are ones where design holds sway. On both ends of the data signal, teams of designers (user researchers, developers, product designers, visualization specialists, and so on) fine tune the interactions and experiences of human-machine 'configurations' (Suchman, 2006). The data signal is increasingly a matter of design and the quality of signals reflects the competency of designers. To the extent that resilience comes to rely on data signals, it too is subsumed into a design paradigm. Resilience thinking becomes design thinking. In this new scenario, the challenge for resilience thinking is not simply to design good signals – which may further perpetuate a naïve form of 'smart' resilience – but to accommodate the limits of this data signal-ontology and its design epistemologies. Resilience cannot become one designed user experience among others.

Note

1. These are a selection of signals taken from the different scenarios of dashboard use I opened with.

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‘The hole of the world’: designing possibility through topography in Congo’s urban settings

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Introduction

Design appears increasingly to be presented as a way of overcoming the limits of planning (Cowley, this issue). But what about the limits of design? Tkacz (this issue) reminds us that the distributed agency implied by design thinking should not be equated with the state or other powerful actors ‘taking no action or letting things be’. But what might design – or resilience – mean in a context where the state has become but one actor amongst many others, where the provision of formal infrastructure has become rare and insufficient, and where urban master plans never seem to materialise in any predictable way, if at all? Here I draw on my long field research experiences in Kinshasa (Democratic Republic of Congo) to problematise the norm of living with uncertainty. I observe that local residents do ‘cope’ by investing the ‘hole’ of everyday life with their own meanings; but my tale, I hope, allegorically pre-empt an understanding of design as having *replaced* planning, or the desire that it should.

The post-colonial 'hole'

In the prologue of one of Sony Labou Tansi's earliest theatre texts entitled *Le trou*, 'the Hole', a play that was never performed during his lifetime and was only posthumously published, the celebrated novelist and playwright from Congo-Brazzaville writes:

There is the 'hole': so as not to fall into it, one has to enter it. The hole of life, the hole of the others. The hole of the world. The hole of hopes. The hole of reality – and the hole of dreams. The hole of religions and the hole that your own flesh is making inside yourself. (...) And then there is the hole that we call TOMORROW: tomorrow is set up as if it were an explosive. But with its foot, 'today' traces 'tomorrow' in the sand. (Labou Tansi, 1998, pp. 61–62; my translation)

Similar to the literary universe of Sony Labou Tansi, where the *topos* of the hole is used as a central trope to meditate about space, time, body and the general human condition, in the megalopolis of Kinshasa, the capital of the Democratic Republic of Congo, the figure of the 'hole' has become a local master trope, a key concept to express the dismal quality of urban living in today's post-colonial city. In its very design, the city has often come to resemble a black hole that seems to be more corrosive than the life forms it engenders and hides. Historically, the metaphor of the post-colonial hole stands in sharp contrast to another topological figure, that of the mountain, a figure that embodies older historical layers, both colonial and pre-colonial, that have contributed to the physical and mental landscapes of the city as it presents itself today.

In this short text, I will use the opposite but related *topoi* of mountain and hole to reflect upon 'cityness' in this part of the world, and upon the (im)possibility of the city as a place of inhabitation, where people attempt to live, live together and chart out a life, but that is also a place in constant need of stabilisation and predictability. There seems to be something about the city that refuses such inhabitation; something that makes all possibilities of inhabitation suspect; that eludes any attempt to moor the city, tie it down and make it act in a predictable way, as if the city were indeed an explosive device, set to go off at any moment.

River deep, mountain high

Kinshasa, the capital of the Democratic Republic of Congo and home to at least ten million inhabitants, is growing at an alarming speed. It is bordered on its north flank by the Malebo Pool, the vast inner sea that the Congo River becomes at this point. It therefore has no alternative but to expand to the west and south of its old colonial core in direction of the Lower Congo, and to the east, where a vast sandy plain stretches from the southern bank of the Malebo Pool to the foot of the imposing Mount Mangengenge, the eastern gateway to the city for rural newcomers coming from its hinterlands. Rising up into the sky like the white cliffs of Dover, Mount Mangengenge has always been held sacred. In pre-colonial times, it was a site of ancestral worship for the local Bateke, Bahumbu and Banfunu populations that inhabited the area long before the arrival of Bula Matari, 'breaker of rocks', as the local population dubbed Henry Morton Stanley, who represented and embodied King Leopold's harsh colonial rule. The colonial intrusion and occupation that Stanley set in motion when he first arrived in the Pool in 1877 greatly disturbed the world of its inhabitants and would forever change the existing political and spiritual geography of the Pool. Mount Mangengenge bears the marks of that process of transformation. Due to the impact of the new world that was introduced by the Belgian colonisation, Mount Mangengenge gradually lost its former

spiritual significance as an ancestral site to become a Christian place of worship, close to the Almighty God that the white missionaries had brought along with them. Over the years, the mountain became an established pilgrimage site for Kinshasa's Catholics. And today, it is in the process of being re-colonised yet again; this time by Kinshasa's rapidly growing army of Pentecostals. In the process, Mount Mangengenge has now become Mount Tabor in reference to the place where Jesus started to shine with bright rays of light (Matthew 17:1–9, Mark 9:2–8, Luke 9:28–36).

If today the provisional eastern endpoint of Kinshasa's growth is Mount Mangengenge, the actual starting point of the city was another mountain: Mount Khonzo Ikulu. Located near the rapids where the Pool narrows to become a river again, Khonzo Ikulu was chosen by Stanley as the site to set up camp shortly after his return to the Malebo Pool in 1880, three years after the epic transcontinental journey that brought him worldwide fame. Soon renamed Leopold Hill, Khonzo Ikulu was a salubrious and easily defensible site that overlooked the small bay of Kintambo, a short distance from one of the most important pre-colonial Teke villages of the Pool. In Stanley's wake, the Arthington Mission of the Baptist Church established a mission station at the top of Leopold Hill in July 1882. A year later, in 1883, Stanley and his Association concluded an important treaty with a confederation of local chiefs, including the powerful Teke chief Ngaliema who lived on the slopes of Khonzo Ikulu. From then onwards and for many years to come, the flag of the Association would fly from the summit of Leopold Hill on important occasions, while Ngaliema and all the chiefs from the surrounding villages were ordered to hoist the same flag on Sundays, signalling their obedience to the new colonial rule.

Like Mounts Mangengenge and Khonzo Ikulu, many of the Pool's surrounding mountains underwent profound transfigurations during colonial and post-colonial times. As the geographical emanation of local notions of sovereignty and ancestral authority, they had once been important places in the topography of pre-colonial political and ritual power constellations. They were then transformed into sites that came to symbolise the superiority of the new colonial powers. The colonial intruders colonised the mountains through military might and missionary zeal. They planted their flag or cross on the mountain tops, and by renaming the mountains they erased their former connotations and inscribed new meanings on their surface: new notions of sovereignty and governance, new power and knowledge regimes and the new ideologies of colonialist modernity and Christian faith (which in turn are being redefined today by the agendas of neoliberalism and charismatic Christianity).

Of mountains and skyscrapers

The histories of the autochthonous Humbu and Teke courts, the Belgian colonial enterprise and Mobutu's post-colonial state project of Zaire were to a great extent connected, within the setting of the Malebo Pool, by the fact that they all 'thought like a mountain' (cf. Pandian, 2014) in their own individual ways. All these actors (chiefs, colonisers and post-colonial nationalists) turned the topography of the mountain into a powerful metaphor to convey and give form to how each of them understood governance, sovereignty, domination, control and coercion. In all these historical time frames, the figure of the mountain formed the anchoring point for the many specific (and often conflicting) meanings given to notions of colonisation, territorialisation and occupation. And today, the mountains surrounding the city of Kinshasa continue, like living palimpsests, to carry within them these various pasts.

In colonial times, the topographical framework offered by the mountain also provided the conceptual ground that enabled the birth of the colonial city. The mountain not only symbolised the panoptical and authoritarian ambitions of the colonial state but its vertical dimension also formed the perfect illustration of the ambitious dreams of colonialist modernity. The emerging physical landscape of the post-Second World War colonial city symbolised these dreams to the full. In the period following the Second World War, the sky was the limit for Léopoldville, and the colonial image of the mountain was reinforced by and translated into the vertical propositions of tropical modernist architecture. As Tim Ingold recently noted: 'In the contemporary world the skyscraper model (...) has come to dominate the way in which mountains, particularly of a more iconic or spectacular kind, have come to figure in the popular imagination' (Ingold, 2015, p. 32). In 1946, the Forescom Tower, Central Africa's first skyscraper, was built in the centre of Léopoldville and, epitomising colonialism's triumph, it came to replace the symbolic importance of Leopold Hill. Like the latter, colonialism's vertical architectures were also re-appropriated by the Mobutist state after Independence, when it constructed its own skyscraper alongside the Forescom Tower. This post-colonial skyscraper was the Sozacom Tower, built between 1969 and 1977, a stone's throw away from the Forescom Tower on the city's central *Boulevard du 30 Juin*. Higher and more imposing than its colonial predecessor, it became the city's new landmark.

Postcolonial holes

However, many of the dreams these mountains and skyscrapers engendered have become disappointments today. Even though the image of the skyscraper is recycled in the new urban overhaul that is taking place in Kinshasa at this moment (see De Boeck, 2011; De Boeck & Baloji, 2016), and even though it still functions as a powerful topos that embodies the current regime's aspirations of insertion into a more modern and global world, the raw urgencies of living in the physical and social environments of Congo's capital constantly belie these dreams. There is a large gap between official urban planning projects and management policies and the reality of everyday lives in the shadow of the colonial and post-colonial towers. The political, economic and cultural structures and processes that have caused this gap are multiple and they not only have deep historical roots but they are also exacerbated nowadays by the extractive nature of neocolonial economies at play throughout Congo, as well as by increased global processes of financial speculation, a growing democratic deficit and quite simply a profound lack of concern on behalf of the state as to whether its citizens live or die. Participatory urban planning strategies are non-existent, the legal frameworks concerning land rights, property value and zoning rules are completely non-transparent, and basic infrastructural services such as the supply of water and electricity are utterly neglected by the state. Moreover, there seems to be a general lack of genuine interest on the part of politicians and decision-makers to know more about what actually constitutes everyday life for the majority of people trying to survive in the often harsh realities of the existing urban environment. In the face of all this, Congo's urban residents have long since stopped thinking that their cities are glorious mountains, for the only mountains that appear on the horizon of their urban worlds are ones made up of garbage piles that urban authorities have ceased to collect.

Instead, in their attempts to make sense of the life that the city imposes on them, urban denizens have turned to opposite topographical figures: the sinking ground and the hole.

In Kinshasa as in Congo's other cities, the concept of hole, or *libulu* in Lingala (which is the city's lingua franca), has come to define the wretched, dreary place that the city has become for many of its inhabitants. The 'hole' has become a local master trope, a conceptual figure, to express the dismal quality of urban life in the post-colonial city. In the minds of many, the city has quite literally become 'hollowed land'. This should not be confused with Eyal Weizman's use of the term to describe the sophisticated tunnel infrastructure that Israel employs in its late-modern colonial occupation of the West Bank (Weizman, 2012), but should be understood in a much more immediate and less sophisticated way. Post-colonial urban living in Congo *literally* means living with potholes as generic urban infrastructures. It also means living with the constant danger of soil erosion after heavy rainstorms, which create giant holes and ravines that swallow houses, streets and people. Living in the post-colonial hole also means surviving on the meagre livelihoods provided by artisanal mining holes. Finally, the image of the hole refers to the ultimate hole of the grave and to the city itself as a death-world and a 'cemetery of the living' (Mavinga Tsafunenga, 2011).

The concept of holes that urban residents revert to in order to express the quality of their lives in the setting of the city refers to the tangible physical depressions on its surface as well as to the black hole of urban living, the dark matter of the urban praxis itself. The term 'hole market' (*wenze ya libulu*) is a commonly used autochthonous metaphor to describe all of the shady deals that urban residents have to make in order to survive in the city's informal economy. Similarly the notion of the hole describes all the impromptu movements into often uncharted spatial, social and mental territory that the city obliges them to make. As Joshua Walker observes in his anthropological analysis of the Congolese diamond mining city of Mbuji Mayi, holes are both symptom and metaphor 'for an experience of loss that is simultaneously material and moral. Erosion itself signifies not only the city's physical decline; it also informs discourses about the corrosion of wealth and values (...)' (Walker, 2014, p. 76). Holes, in other words, have become potent local tropes by means of which Congo's urban residents encapsulate their experience of living in what they often describe themselves as a 'multicrisis'. At the same time, Walker rightly reminds us that 'discourses of holes – which imply removal and the empty spaces it produces – are deeply problematic' in that they suggest that urban existence is solely defined by 'depletion, as if the processes of extraction were not, themselves, productive in any sense besides the depletive' (Walker, 2014, p. 31). Indeed, the hole is never just a black hole. The hole, not unlike shadow, is never merely hollow or emptied of content. Holes also have the capacity to metaphorically elide how life continues through, and despite, decline. And even if living the experience of the hole considerably complicates life and often degrades its quality, the hole itself also offers an aperture, an opening, a possibility, at least for those who know how to read an alternative meaning into its blackness. Elsewhere (De Boeck & Baloji, 2016), I have fleshed out this notion in a much more ethnographically grounded way. But to give but one example within the confines of this short paper: In Kinshasa's informal economy the gap or 'hole' that exists between two people with complementary resources or knowledge might be exploited by a third party to generate an opportunity and conclude a good bargain or *coop*, as it is called in Kinshasa (cf. Nzeza Bilakila, 2004), much in the same way that network models of competition describe competitive advantage as a matter of access to 'structural holes' in relation to market transactions (cf. Burt, 1995).

Holes as points of suture

In Congo's post-colonial urban worlds, the hole, therefore, is the city's baseline, its ground zero. And in this sense, the hole is also a suture. Nancy Rose Hunt has used the concept of suture in order to join together different colonial medical histories in Congo in new ways (Hunt, 2007). Suturing, she argues, suggests closing a wound, making an incision or stitching together parts, locations and points of view; as such it points to new kinds of creativity with sources, evidence and interactivity. I would like to pick up on this idea and extend the notion of suture as closure, as junction and as a seam, to the way in which, often against all odds, the inhabitants of Congo's urban landscapes read meaning into the black hole of the city; the way in which they use material, but also mental and moral holes, as suture points to fill the gaps, overcome the hiatus, design realignments and thereby redefine the zero – that is, the impossible circumstances of living in the kind of urban environment that Congo's cities offer – into a possibility, a something else, a surplus. Taken like this, the notion of suture remains close to how Jacques-Alain Miller, who first introduced the concept of suture in Lacanian psychoanalysis, originally interpreted it. For him, suture is always between zero as a lack, as something impossible to conceptualise, and zero as a number, as 'one'. It is in that sense that the hole as suture both represents lack while also placing and 'suturing' it:

Suture names the relation of the subject to the chain of its discourse; we shall see that it figures there as the element which is lacking, in the form of a stand-in (*tenant-lieu*). For, while there lacking, it is not purely and simply absent. Suture, by extension – the general relation of lack to the structure- of which it is an element, inasmuch as it implies the position of a taking-the-place-of (*tenant-lieu*). (Miller (1966/2012, 93)

What is important to capture and understand, it seems to me, is how urban residents do exactly that: how they manage – with varying degrees of success – to turn the zero into a one; how they read potential, promise and prospect into the blackness of the hole; how they throw themselves – their words and their own bodies – into this daily struggle with the city's madness; and how it is the hole itself that propels them to do that. In this sense, tropes of hole and suture tell us something about the changes that have taken place in how urbanity is imagined and lived in the Democratic Republic of Congo today. The hole and its opposite, the mountain/tower, offer topographical meta-concepts that the inhabitants of Kinshasa use to reflect on the material degradation of the city's infrastructure but also to rework the closures and the often dismal quality of the social life that has followed in the wake of the material ruination of the colonial city. Even though the library of our knowledge about life in the cities of the global South has considerably expanded over the last two decades, for anthropologists and others who analyse the state of things in such urban environments this nevertheless continues to be one of the main tasks: to understand how exactly such 'reworking' and reassembling take place, in what attempts are made to fill the post-colonial hole and what possible answers urban residents come up with in response to the challenge it poses.

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